PATENT SPECIFICATION

651,969

Date of Application and filing Complete Specification: Sept. 9, 1947.

No. 24788/47.

Application made in United States of America on Jan. 2, 1947.

Complete Specification Published: April 11, 1951.

Index at acceptance:—Classes 42(ii), F; 120(ii), D2a5c; and 140, A2(d: f: x).

COMPLETE SPECIFICATION

Improvements in and relating to Roller Covers, especially for Use in Conection with Textile Machinery

We, THE DAYTON RUBBER COMPANY, an Ohio Corporation, of 2345, West Riverview Avenue, Dayton, Ohio, United States of America, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

The present invention concerns improvements in and relating to roller covers, especially for use in connection with textile machinery such as machinery for spinning, drafting, or the like.

Rollers used with textile machinery usually have a small diameter, so that the covers for such rollers have to withstand a high degree of curvature. It has always been difficult to make cots or other roller covers sufficiently flexible so that they will snugly fit such small rollers while at the same time be rigid and resistant to deformation so that the covers will not travel on their immediate support.

It is an object of this invention to provide covers for rollers of textile machinery which will have a high degree of surface flexibility while at the same time possessing great resistance to the deformation causing stresses.

It is another object of this invention to provide covers for rollers of textile machinery which will not travel on said rollers during use.

Another object of this invention consists in the provision of covers for rollers of textile machinery, which will remain free from electrostatic charges during operation so that no " eyebrowing " will occur.

The invention comprises a roller cover, especially for use in connection with textile machinery, which comprises a tension section of hard resilient rubber, a compression section containing a soft cushioning rubber, and a neutral axis section which is interposed between said tension section and said compression section and includes wire as reinforcing elements.

The invention is illustrated by way of example in the accompanying drawings in which:—

Figure 1 is an elevational view of a pair of rollers for use in textile machinery, one of said rollers being illustrated partly in section in order to show the construction of the cover thereon;

Figure 2 is a section along the line 2—2 of Figure 1, but on a scale larger than the latter;

Figure 3 is a perspective fragmentary view of another embodiment of this invention;

Figure 4 is a cross sectional view of a cable suitable for the reinforcement of the neutral axis zone of the cover according to the invention;

Figure 5 is a perspective fragmentary view of a further modification of this invention;

Figure 6 is a longitudinal section taken along the line 6—6 of Figure 5;

Figure 7 is a fragmentary perspective view of still another modification of this invention;

Figure 8 is a fragmentary perspective view of a further modification.

Referring now to the drawings in detail and to Figures 1 and 2 thereof in particular, the structure shown in Figure 1 comprises an axle shaft 10 having mounted thereon two rollers 11 and 12. Each roller has a rubber cover 13 which comprises an inner compression section 14, a neutral axis section 15 and an outer tension section 16. According to Figure 2, the neutral axis section comprises two layers 17 and 18 of substantially parallel wire cords extending in the direction of the longitudinal axis of the cover. These cords are embedded in rubber or synthetic rubber. The two layers 17 and 18

are staggered with regard to each other to provide a more uniform distribution of the reinforcement and thereby making the roller cover evenly flexible throughout its length. The tension and compression sections are also formed of rubber material, the compression section being of a soft and cushioning composition and the tension section being of a hard and resilient composition. The embodiment of Figure 3 comprises a compression section 19, a neutral axis section 20 and a tension section 21, while a plurality of substantially parallel cables 22 is embedded longitudinally in the rubber material of the neutral axis zone. The cables 22 may be constructed in various manners. Thus, for example, the cables may be twisted from several thin wires made of steel or other metal. If steel wires are used, it is preferable although not obligatory to plate the wires with copper to increase the bond of the reinforcing elements with the rubber. According to Figure 3, cables are used which consist of a plurality of cords, each cord being twisted from a plurality of very fine wires. One specific example which has proven particularly successful is a cable containing seven cords each of which is twisted from three copper plated steel wires.

Another modification of a cable which has been used with satisfaction is illustrated in Figure 4. This cable 23 comprises a number of metal wires 24 each of which has a coating 25 of rubber bonding material on its surface.

Figures 5 and 6 illustrate a further modification of the invention according to which the cover comprises a compression section 26, a neutral axis section 27 and a tension section 28. A metal wire woven fabric 29 is embedded in the neutral axis zone and consists of transverse wires 31 and longitudinally extending wires 30.

Figure 7 shows another way of reinforcing the neutral axis zone and illustrates a cover comprising a compression section 32, a neutral axis section 33 and a tension section 34. The neutral axis section 33 is built up of a layer of rubber material 35 in which two layers of wire fabric 36 and 38 are embedded in spaced relationship. According to Figure 7 both wire fabrics are layed on a bias.

According to Figure 8 a neutral axis section 39 is reinforced by braided wire 40.

It will be obvious that all the reinforcing elements illustrated in the drawings greatly increase the resistance to stretching of the covers and their resistance to stresses tending to deform the covers. On the other hand, the reinforcing elements according to the invention do not impair th flexibility of the covers since the individual wires used are relatively thin. Although the bond between the metal elements and the rubber is sufficiently high, it is advantageous in some instances to coat the wires prior to their use. For example, steel wires may be coated with copper or other metals which have a higher adhesion to rubber material than has steel.

Other suitable coating materials are resins, different kinds of rubber, and other materials adhesive to rubber. However, as mentioned above, such coatings are not obligatory, especially not in the case of wire mesh or fabrics in the neutral axis zone, since during vulcanization of the cover, a rubber will penetrate the interstices of the mesh and thereby will anchor the various layers with the reinforcing member.

A cover according to the present invention is preferably formed by building up the layers consecutively on a mandrel, then cutting the built-up layers into the desired width according to the width of the textile unit, and then curing these units in a mold. All natural or synthetic rubbers customary in the art may be used for the article according to the invention. However, butadiene copolymers and neoprene have proven especially suitable for this purpose.

It will be evident that the reinforcing elements may be made either entirely of metal or of any combination of metal with other material. Thus textile cords or fibers, synthetic resin material may be combined with the metal. The covers may be cemented onto the rollers, or else they may be made of a slightly smaller diameter than that of the rollers so that the covers have to be stretched before mounting and are held in place by the forces of resiliency.

The covers of this invention do not travel on the rollers during use but remain thereon in the same position which they occupied when they were first mounted. Due to the high electrical conductivity of metal, electrostatic charges do not accumulate, which is a highly desirable feature in order to avoid "eyebrowing" of the fibers on the rollers.

Having now particularly described and ascertained the nature of our said invention, and in what manner the same is to be performed, we declare that what we claim is:—

1. A roller cover, especially for use in connection with textile machinery, which comprises a tension section of hard

resilient rubber, a compression section containing a soft cushioning rubber, and a neutral axis section which is interposed between said tension section and said compression section and includes wire as reinforcing elements.

2. A roller cover according to Claim 1 in which the reinforcing elements in the neutral axis section comprise at least one layer of substantially parallel wires arranged longitudinally with regard to the longitudinal axis of the cover.

3. A roller cover according to Claim 1 in which the reinforcing elements in the neutral axis section comprise a plurality of layers, each of which contains longitudinally arranged parallel metal cords.

4. A roller cover according to Claim 3 in which the cords in each layer are staggered with regard to those in adjacent layers.

5. A roller cover according to Claim 1 in which the neutral axis section is reinforced by substantially parallel cables, each of which consists of a plurality of metal wires.

6. A roller cover according to Claim 5 in which each of the metal wires is provided with a coating adapted to increase the bond between the metal wires of the adjacent rubber composition.

7. A roller cover according to Claim 3 or 4 in which each cord is formed of a plurality of thin wires.

8. A roller cover according to Claim 1 in which the neutral axis section is reinforced by at least one layer of mesh wire.

9. A roller cover according to Claim 1 in which the neutral axis section is reinforced by at least one layer of braided wire.

10. A roller cover according to Claim 1 in which the neutral axis section is reinforced by at least one layer of woven wire fabric.

11. A roller cover according to Claim 1 in which the neutral axis section is reinforced by a plurality of layers of wire fabric laid on a bias.

12. A roller cver especially for use in connection with textile machinery, substantially as hereinbefore described with reference to the accompanying drawings.

Dated the 9th day of September, 1947.
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120, East 41st Street, New York, 17, U.S.A.

Leamington Spa: Printed for His Majesty's Stationery Office, by the Courier Press.—1951.
Published at The Patent Office, 25, Southampton Buildings, London, W.C.2, from which copies, price 2s. per copy; by post 2s. 1d. may be obtained.

[This Drawing is a reproduction of the Original on a reduced scale.]

FIG. 1

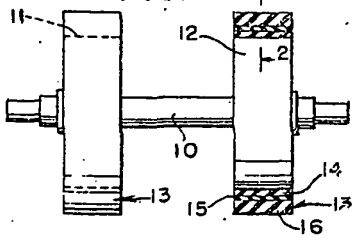

FIG. 2

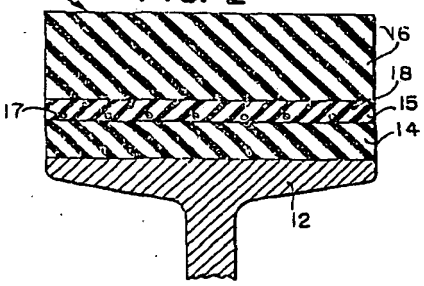

FIG. 5

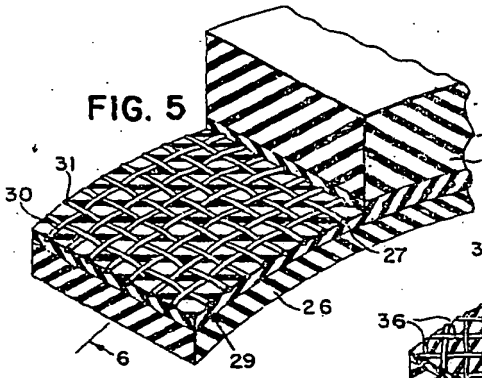

FIG. 7

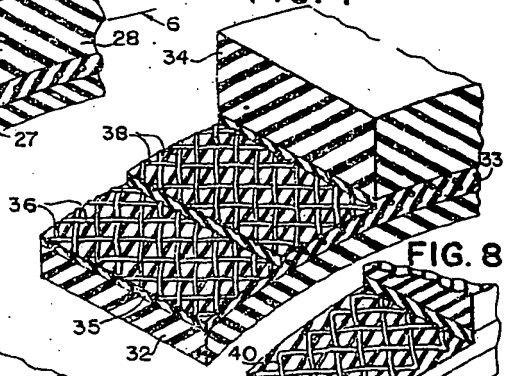

FIG. 8

FIG. 3

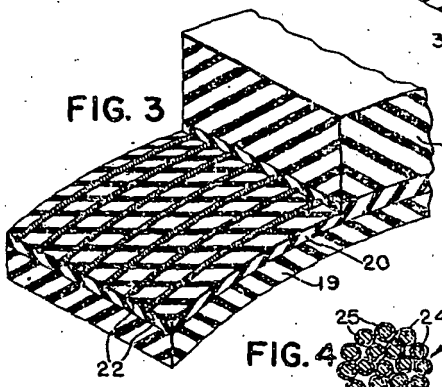

FIG. 6

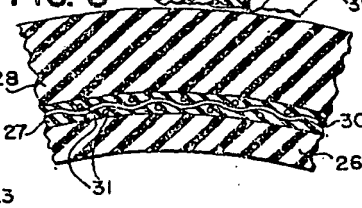

FIG. 4

H.M.S.O.(Ty.P.)